ORIGINAL RESEARCH PAPER
Volume - 13 | Issue - 11 | November - 2024 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

EVALUATION AND MANAGEMENT OF DIABETIC FOOT ACCORDING TO WAGNER'S CLASSIFICATION

General Surgery

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ABSTRACT

Aims & Objectives: To study the role of Wagener's Classification in evaluation and management of Diabetic Foot and also to study the measure to decrease the morbidity and mortality in patients with diabetic foot. **Method:** Adult patients with diabetic wound secondary to type 1 or type 2 diabetes admitted in general surgery department of tertiary care centre were included in the study. Data with various parameters like age, sex, occupation, addiction, examination findings, etc were entered in a pretested proforma. The patients were followed up till discharge and 14 days after discharge. **Results & Observations:** The most common grade with which the patients presented were Wagner's Grade 3 (55%). Most common finding on presentation was cellulitis (45.5%). Most common treatment modality provided to the patients was Debridement (50.5%). Mortality was seen in 4% of the patients. **Conclusion:** It can be safely said that Wagner's Classification still holds good clinical validity in evaluation and predicting the outcome in the diabetic wound patients, as it was seen that the lower grade wounds had a better outcome and recovery than the higher-grade wounds.

KEYWORDS

Diabetic foot, Wagner's Classification, Podiatry, Lower limb amputation, Foot ulcer.

INTRODUCTION

In India, diabetes is a widespread condition that affects 2.4% of rural residents and 4%-11.6% of urban residents [1]. According to estimates from the International Diabetes Federation, 285 million people globally have diabetes in 2010 and over 430 million will have the disease by 2030. The World Health Organization (WHO) projects that between 2005 and 2030, the number of deaths from diabetes would likely Triple. Nearly one in six diabetic people worldwide reside in India, which has the highest prevalence of the disease.

Over the course of their disease, 10% to 25% of diabetics will experience foot problems ranging from minor calluses to significant abscesses and osteomyelitis [2]. Diabetic foot ulcers are the primary cause of hospitalization for people with diabetes, and the risk of lower extremity complications and leg amputation is 40 times higher in diabetic patients than in non-diabetic patients [3].

Diabetes-related foot disease puts an excessive amount of social and financial strain on the patient's family as well as the healthcare system. The primary goal of managing diabetic foot is to prevent lower limb amputation. Despite the fact that there are many classfication systems for grading ulcer, Wagner's Classfication is one among the most straightforward and well known assessment for diabetic ulcers. This study aims to study the validity of the Wagner's classification.

The diabetic foot is defined as the infection, ulceration or destruction of tissues of the foot of a person with currently or previously diagnosed diabetes mellitus, usually accompanied by neuropathy and/or peripheral arterial disease in the lower extremity [4].

The International Diabetes Federation (IDF) estimates that 463 million people worldwide (-88 million of whom are in Southeast Asia) have diabetes in 2020. 77 million of the 88 million people in Southeast Asia are Indian. 2020 saw 8.7% of adolescents under the age of 19 with diabetes, a higher percentage (4.4%) than young adults between the ages of 20 and 29. Diabetes affects 36.9% of seniors over the age of 60.

Risk factors for ulceration include peripheral sensory neuropathy, structural foot deformity, ischemia, trauma, improperly fitted shoe, callus formation, history of prior ulcers/amputations, prolonged and elevated pressures, limited joint mobility, uncontrolled hyperglycemia, longer duration of diabetes, blindness / partial sight, chronic renal disease, old age, etc. [5,6]. The first mechanism of injury is prolonged pressure over a bony prominence (i.e., bunion or hammertoe deformity), which usually causes wounds over the medial, lateral, and dorsal parts of the forefoot [7].

The major treatment goal is to prevent the progression of the disease and preventing the patient ending up in any form of amputation and functional disability. Hence, whenever a diabetic patient presents to the health-care professional, the patient must be thoroughly examined, especially for wound in their extremities. They should be advised to undergo foot examination at least once a year. The various aspects to be kept in mind while examining include, vascular examination - peripheral pulsations, temperature, color, etc.; neurological examination - various perceptions like pressure, vibration, touch, pain, reflexes, two-point discrimination; musculoskeletal examination - deformities, contractures, gait, bunions; dermatological assessment - calluses, fissures, nail, hair, ulcer, tenia, infection, gangrene, etc.; footwear - type, fit, wear, foreign bodies, insoles, etc. Further classifying wounds earlier and planning the treatment play a major role in the successful management.

Wagner's Classification:

According to original article published by William Wagner in 1981 [8]. Classification in given in *Table 1.*

Table 1: Wagner's Classification

Grades	Lesion	
0	No open lesions (may have deformity or cellulitis)	
	A	Ischemic
	B	Infective
1	Superficial Ulcer	
	A	Ischemic
	B	Infective
2	Deep Ulcer (soft tissue)	
	A	Ischemic
	B	Infective
3	Deep ulcer with abscess or osteomyelitis	

	A	Ischemic
	B	Infective
4	Localized gangrene	
	A	Ischemic
	B	Infective
5	Gangrene of entire foot	
	A	Ischemic
	B	Infective

General principles of treatment include both medical and surgical management. Medical management includes control of infection, off-loading, management of ischemia, management of comorbidities, appropriate dressing modalities, etc., while the surgical management include debridement and amputation mainly [9,10].

The management option generally required in various grades of Wagner's Classification vary widely. The lower grade wounds can be managed conservatively and higher-grade wound require surgical intervention. All these recommendations given by William Wagner is tabulated in *Table 2.*

Table 2: Recommended Management Options

Grade	Lesion	Management
0	Foot at Risk	Prevention
1	Localized, superficial ulcer	Antibiotics and glycemic control
2	Deep ulcer to bone, ligament, or joint	Debridement, Antibiotics and glycemic control
3	Deep abscess, osteomyelitis	Debridement, some form of amputation
4	Gangrene of toes, forefoot	Wide debridement and amputation
5	Gangrene of entire foot	Below knee amputation

MATERIALS AND METHODS:

Study Design:
We conducted a tertiary care centre based prospective study starting from November 2020 and ended the study on October 2022, which included 200 study participants with diabetic wound presenting to tertiary care hospital at Aurangabad, Maharashtra, India. The study was approved by the Institutional Ethics Committee of Government Medical College, Aurangabad with approval letter number being "Pharma/IECGMCA/140/2020".

Inclusion Criteria:
1. Patients with diabetic foot secondary to type 1 or type 2 diabetes mellitus
2. Ischemic or neuropathic ulcer in diabetic patients

Exclusion Criteria:
1. Non diabetic patients having wounds.
2. Venous ulcers.
3. Patients not willing to participate in study

Sample Size: 200

Study population:
Adult diabetic patients with wounds being admitted in department of general surgery for wound management in tertiary care hospital in Maharashtra, India.

Study Course:
Data with various parameters like age, sex, occupation, addiction, examination findings, etc. were entered in a pretested proforma.

During the study period the enrolled patients were assessed for the wounds during presentation, progression, treatment offered, outcome until discharge or death. The discharge patients were followed up after 14 days and status of the wound was assessed.

RESULTS:

1. Age Distribution - Age distribution of 200 cases among the patients studied, youngest patient was 17 yrs old and eldest patient was 92 yrs old. Highest numbers of cases were found in the age group of 60-70 yrs. Entire data tabulated in *Table 3.*

Table 3: Age distribution

Age	No. of Patients	Percentage
0 – 10	00	00
10 – 20	02	01
21 – 30	02	01
31 – 40	04	02
41 – 50	36	18
51 – 60	62	31
61 – 70	70	35
71 – 80	18	09
81 – 90	05	2.5
91 – 100	01	0.5

2. Sex Distribution - Of the total 200 cases studied, there were 138 males and 62 females. See *Table 4.*

Table 4: Sex Distribution

Sex	No. of Cases	Percentage
Male	138	69
Female	62	31

3. Neuropathy - Of the 200 cases studied 68 patients were found to have peripheral neuropathy. See *Table 5.*

Table 5: Prescence Of Neuropathy

Neuropathy	Present	Absent
No of cases	68	132
Percentage	34	66

4. Ischemia - Out of 200 cases studied 74 patient had signs of ischemia. See *Table 6.*

Table 6: Prescence Of Ischemia

Ischemia	Present	Absent
No. of cases	74	126
Percentage	37	63

5. Nature of Presenting lesion - Among the studied patients, most common presentation was Cellulitis (45.5%) followed by Toe gangrene (19%). Details given in *Table 7.*

Table 7: Nature Of Lesion

Lesion	No. of cases	Percentage
Redness with pain	02	01
Superficial ulcer	04	02
Deep ulcer	31	15.5
Ulcer with abscess	07	3.5
Deep abscess	12	06
Cellulitis	91	45.5
Necrotizing fasciitis	01	0.5
Toe gangrene	38	19
Foot gangrene	14	07

6. Presentation according to Wagner's classification - Maximum patients presented with Grade III lesion (55%) followed by Grade IV lesion (19.5%) of Wagner's classification. See *Table 8.*

Table 8: Distribution Of Grades

Grade	Frequency	Percentage
0	02	1
1	04	2
2	31	15.5
3	110	55
4	39	19.5
5	14	7

7. Treatment Modalities - Debridement was the most common treatment modality (50.5%). See *table 9.*

Table 9: Treatment Modalities

Treatment	Frequency	Percentage*
Conservative	2	1
Incision & drainage	7	3.5
Debridement	101	50.5
Grafting	36	18
Toe amputation	31	15.5
Foot amputation	5	2.5
Below knee amputation	35	17.5

Above Knee amputation	19	9.5
*Sum of percentages overshoot than 100 due to overlap of treatments		

8. Mortality - Of the total 200 patients, 194 patients cured and 08 patients died. Among the Died patients, maximum no. of deaths was from grade III followed by grade V and grade II. No deaths were observed in patients with grade 0 and grade 1. See *table 10.*

Table 10: Mortality

Grade	Deaths
0	00
1	00
2	02
3	03
4	01
5	02

DISCUSSION:

The study examined 200 participants, with the youngest patient being 17 years old and the oldest being 92 years old. The age range of 60-70 years old had the highest number of instances. In contrast to the research done by Prashant G.K. et al. [3], the bulk of our cases involved those over 60, whereas the majority of the cases in their study involved people in the 41-50 age range.

138 of the 200 cases that were examined were male, and 62 were female. The ratio of men to women was 2.22. In line with studies conducted by Prashant G.K. et al. [3] and Dr. Narayana Swamy T. et al. [2], our study shows a greater proportion of male patients and a lower proportion of female patients. Males may have a higher incidence of diabetic foot because of their exposure to work-related accidents, which primarily affect the insensitive foot.

In this investigation, diabetic peripheral neuropathy-which was discovered in 34% of the patients-plays a significant role in the frequency and severity of lesion development. These individuals reported a history of burning and prickling discomfort in their extremities. Examining the patient revealed diminished or non-existent vibratory and cutaneous sensation. In a population-based study conducted in 2020, Dr. Narayana Swamy T. et al. revealed a significant prevalence of neuropathy (62%).

Of all patients examined, cellulitis accounted for 45.5% of the presentations, with deep ulcers coming in second at 15.5%. Amputation was necessary for a lesion in 26% of the patients. According to a study by Dr. Narayana Swamy T. et al. [2], cellulitis (21%) and deep ulcers (36%) were the two most prevalent lesions at presentation.

Maximum patients enrolled in this study presented with Grade III lesion (55%) of Wagner's classification followed by Grade II lesion (15.5%). In the study conducted by Dr Narayana Swamy T. et al. [2], maximumpatients presented with grade II lesion (36%) followed by grade III lesion.

In the present study, maximum number of patients were managed by Debridement (32.5%), while in study conducted by Dr. Rajesh Mahey et al. [11] maximum patients were managed by below knee amputation (29.7%).

In the present study 96% patients cured and 04% patients died during treatment, while study conducted by Prashant G.K. et al. [3] all the patients cured with no mortality and in study conducted by Dr Narayana Swamy T. et al. [2] 72% cured and 28% patients died.

Most patients of advanced grade showed poorly managed diabetes which can be attributed to association with peripheral neuropathy and vasculopathy. There was also a correlation between increasing grades of Wagner's with advancing age and duration of diabetes. Attempts to resolve any infection will be impaired in the presence of lack of oxygenation and infection at the site. Hence early recognition and aggressive treatment are vital for lower limb salvaging.

CONCLUSION:

- Wagner's classification is very helpful for Diabetic foot disease in correlating appropriate treatment to proper grade of lesion with better outcome. Grade 0 and Grade 1 lesions are treated with conservative management with antibiotics, grade 2 and grade 3 lesions are treated with debridement while grade 4 and grade 5 foot lesions require some kind of amputation. (Toe amputation in 15.5%, Below knee amputation in 17.5% and above knee amputation in 9.5% in present study).
- Wagner's grade 3, grade 4 and grade 5 lesion is associated with higher mortality as compared to grade 0, grade 1, and grade 2.
- Foot ulceration in diabetic patients is healthcare resource consuming, associated with loss of productive life years. Foot ulceration often progress towards lower extremity amputation, if not treated appropriately.
- Effective patient education regarding glycaemic control with antidiabetic treatment and foot care are of key importance for decreasing diabetic foot disease. Prevention is the best treatment.

REFERENCES:

1. Connor H: Some historical aspects of diabetic foot disease. Diabetes Metab Res Rev. 200824, 1:7-13. 10.1002/dmrr.838
2. Dr Narayana Swamy T, Dr Chandra Vamsi Krishna M: A Prospective Study on Clinical Evaluation and Management of Diabetic Wounds according to Wagners Classification in Tertiary Care Hospital. Journal of Medical Science and Clinical Research. 2020, 8:528 - 531. 10.18535/jmscr/v8i7.86
3. Prashant G.K., Suryanarayan Reddy V: Wagner's classification for management and evaluation of diabetic foot: a prospective study. International Journal of Research and Review. 2021, 8:327-331. 10.52403/ijrr.20210745
4. van Netten JJ, Bus SA, Apelqvist J, et al.: Definitions and criteria for diabetes-related foot disease (IWGDF 2023 update). Diabetes Metab Res Rev. 2024, 40:3654. 10.1002/dmrr.3654
5. Reiber GE, Vileikyte L, Boyko EJ, et al.: Causal pathways for incident lower-extremity ulcers in patients with diabetes from two settings. Diabetes Care. 1999, 22:157-162. 10.2337/diacare.22.1.157
6. Gayle E. Reiber, Edward J. Boyko and Douglas G. Smith: Lower Extremity Foot Ulcers and Amputations in Diabetes. Researchgate. 2017, 1:409 - 428.
7. Abbott CA, Vileikyte L, Williamson S, et al.: Multicenter study of the incidence of and predictive risk factors for diabetic neuropathic foot ulceration. Diabetes Care. 1998, 21:1071-1075. 10.2337/diacare.21.7.1071
8. Wagner F. W., Jr (1981): The dysvascular foot: a system for diagnosis and treatment. Foot. 2:64-122. 10.1177/107110078100200202
9. Lazarus GS, Cooper DM, Knighton DR, et al.: Definitions and Guidelines for Assessment of Wounds and Evaluation of Healing. Arch Dermatol. 1994, 130:489-493. 10.1001/archderm.1994.01690040093015
10. Lazarus GS, Cooper DM, Knighton DR, et al.: Pulsed lavage in wound cleansing. Physical therapy. 80:292-300. 10.1093/PTJ/80.3.292
11. Dr Sudatta Waghmare, Dr Harshal Meshram, Dr Rajesh Mahey, et al.: Evaluation and management ofdiabetic foot according to Wagner's classification. International Journal of Surgery Science. 2019, 3:197-201. 10.33545/surgery.2019.v3.i4d.239